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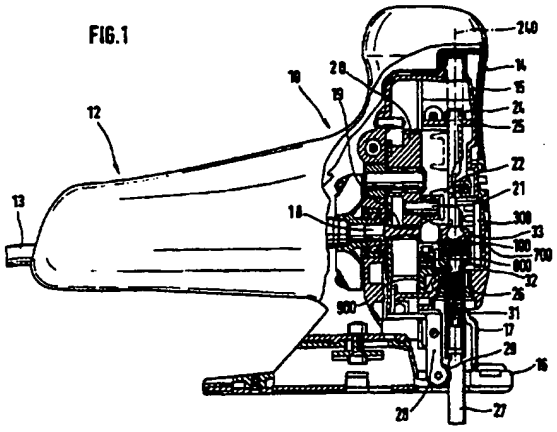
(54) Abstract Title
Manually guided jig saw machine

(57) For a manually guided jig saw machine (10) with a motor- and gearing housing (12, 14, 15) and with a lifting mechanism (24), which is guided in said housing, is drivable by the motor and at its lower end supports a clamping device with a clamping sleeve (32) for releasably accommodating a saw blade (27), it being possible to actuate the clamping sleeve (32) manually from the outside by means of a switching element (600, 300, 200) without the need for an auxiliary tool, a clamping system which is economical and comfortable for the saw blade change is provided in that the clamping sleeve (32) and the switching elements (200, 300, 600) are arranged so as to be adjustable inside the gearing housing (14, 15).

FIG.1



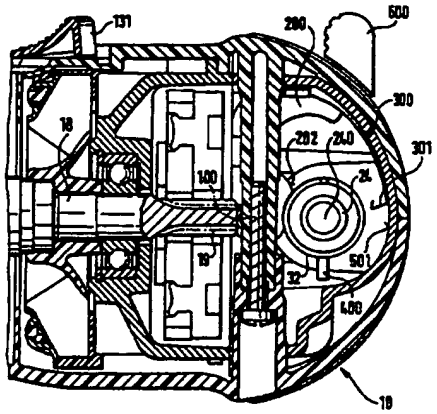


FIG. 4

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MANUALLY GUIDED JIG SAW MACHINE

State of the art

The invention relates to a manually guided jig saw machine according to the preamble of claim 1.

According to EP 0 544 129, a manually guided jig saw machine with a lifting mechanism is known, at whose end a saw blade clamping device with a clamping sleeve is arranged, which by actuating a switching sleeve rotatably mounted on the gearing housing can be moved into a clamping or release position in order to remove a used saw blade or to fit a new saw blade.

The saw blade clamping device and the switching sleeve of the known jig saw machine are arranged outside a sealed housing and therefore scarcely protected against dust and dirt. This can impair the function of the saw blade clamping device. Furthermore, the clamping sleeve of the saw blade clamping device has a relatively large diameter and is heavy. Consequently, the clamping sleeve has to be arranged outside the lower lifting mechanism bearing and must be arranged at a distance from the lower lifting mechanism bearing at least equal to the stroke of the lifting mechanism, in order to avoid impact. Consequently, the distance between the upper and lower lifting mechanism bearings needs to be kept relatively small. This restricts the loadability of the lifting mechanism with higher bending moments. This means that even slight bending forces can deflect the lower lifting mechanism end with the clamping sleeve and the saw blade, thereby impairing the precision of the sawing incision.

Advantages of the invention

The manually guided jig saw machine according to the invention having the characterising features of claim 1 comprises a clamping device which is mounted inside the gearing housing and whose clamping sleeve is so slim that it

can be enclosed and guided by the lower lifting mechanism bearing, the lower lifting mechanism end and the lower end of the clamping sleeve being positioned almost entirely inside the gearing housing in the top dead centre position of the lifting mechanism and only projecting from said housing with its outermost end or the saw blade.

Consequently, the lifting mechanism bearings of the jig saw can be arranged at a great distance part and result in a particularly rigid lifting mechanism guidance with resulting high precision sawing incisions, since the lifting mechanism is not susceptible to the forces acting upon it via the jig saw blade during sawing and the saw blade is therefore guided in a very direct manner which is resistant to bending.

Since the clamping device of the jig saw is protected against dust and dirt inside the jig saw housing and is wetted with gearing lubricant, a saw blade change can be carried out easily and comfortably, susceptibility to breakdown is low and service life is long.

As a result of the fact that multi-part switching elements - constructed as interlocking levers - are used instead of a switching sleeve for actuating the clamping sleeve, said elements require little assembly space, can be comfortably accommodated in the interior of the gearing housing of the jig saw, are protected from dust and dirt and on account of the wetting with lubricant from the gearing housing are mounted in a particularly low friction manner, can therefore be handled smoothly and comfortably and have a long service life.

As a result of the fact that the lever system for actuating the clamping sleeve moves about a defined, axle-like point of rotation, the path of movement of the lever system is precisely defined, friction can be reduced with little use of lubricant and operating comfort is high.

As a result of the fact that the lever system can be manufactured from plastics material, it can be manufactured in a particularly simple manner and has a low weight.

As a result of the fact that the clamping lever is constructed as a ring or ring segment, it is particularly resistant to deformation and very directly responsive during actuation, since it transmits the force to the clamping sleeve without delay, its friction surface being relatively small as compared with the guide surfaces on the inner wall of the gearing housing, which means that operating comfort is high.

As a result of the fact that the lever system is made of sheet metal stamped bending parts, it can be economically manufactured, has a small structural volume and as a result of its high degree of strength has a long service life.

As a result of the fact that the clamping lever supports an operating button at its free end, supports a support lever in its central region and in the region of its part which is mounted so as to pivot about the axle supports a wedge-like cam section for the forward swing-displacement of the lifting mechanism, the clamping lever can perform numerous functions.

As a result of the fact that a clamping lever, which is constructed as a slide-like element and is mounted on the inner contour of the inner housing, is pivotable about a purely virtual point of rotation, the clamping lever supporting in articulated fashion the support lever, which acts upon the clamping sleeve and is coupled to a lifting mechanism advance constructed as an annular element and with an eccentric annular inner side forcing the lifting mechanism forwards during the tensioning of the clamping sleeve, the lever system has an extremely small volume and can therefore be arranged structurally flat which is expedient for the shaping of the jig saw.

As a result of the fact that parts of the lever system are made of spring steel, which are rigidly secured to inherently rigid levers, the lever system can be manufactured even more economically, it being possible to dispense with joints and separate tensioning springs.

As a result of the fact that the operating button emerges from the housing of the jig saw on a thin sheet metal arm, only a narrow slot is required for the adjustment region of the sheet metal arm or button element, which slot can be easily sealed in order to prevent dust and dirt from penetrating the interior of the gearing housing and to prevent lubricant escaping therefrom.

As a result of the fact that the switching element is a sheet metal bending part, the lever system can be reduced to a minimum of individual parts which are displaceable relative to one another and can be manufactured economically.

As a result of the fact that the support strip for receiving the lever system is constructed as a sheet metal punched part and supports an angled abutment for limiting the pivoting path of the clamping sleeve, more particularly for the abutment of the driving nose, the support strip can be economically manufactured and prevents excessive tensioning of the clamping sleeve or the tensioning spring thereof.

Drawings

The invention will be explained in further detail in the following by way of an embodiment with the aid of the associated drawings.

Figure 1 is a longitudinal section through a jig saw according to the invention,

Figure 2 is an enlarged section of Figure 1 in the region of the clamping and switching device in the gearing housing,

Figure 3 is a vertical cross section through the gearing housing showing the switching elements,

Figure 4 is a horizontal cross section through the gearing housing according to Figure 2,

Figure 5 is a complete vertical cross section through the gearing housing in the region of the switching device,

Figure 6 is a schematic cross section, similar to Figure 4, showing the method of operation,

Figure 7 is a horizontal cross section through the gearing housing with plastics material switching elements,

Figure 8 shows the cross section through the gearing housing according to Figure 7 with the switching elements in the open position,

Figure 9 is an exploded view according to Figure 7,

Figure 10 is a cross section through the gearing housing with a further embodiment of the switching elements,

Figure 11 is a perspective view according to Figure 10,

Figure 12 is an exploded view according to Figure 11,

Figure 13 is a further perspective view according to Figure 10,

Figure 14 is a cross section through the gearing housing with switching elements made of metal,

Figure 15 shows the cross section through the gearing housing according to Figure 14 with switching elements in the open position,

Figure 16 is a perspective view according to Figure 14,

Figure 17 shows the illustration according to Figure 16 rotated through approximately 90°

Figures 18, 19 are cross sections through the gearing housing similar to Figure 14 with the switching elements in the open position, and

Figures 20 and 21 show the perspective view of the switching elements according to Figures 18, 19 from different directions.

Description of the embodiment

Figure 1 shows a jig saw 10 with a motor housing 12 which acts as a handle and extends parallel to the feed direction, an electric cable 13 emerging from the rear region of said motor housing 12.

In the front region, the jig saw 10 comprises a gearing housing 14 which is flanged onto the motor housing 12, is made of plastics material and encloses an inner housing 15 made of metal. The motor housing 12 together with the gearing housing 14 is arranged so as to be angularly adjustable relative to a base plate 16, so that mitre cuts can be made. A rod-like contact protection element 14 (should presumably read "17"), which prevents accidental contact with the saw blade 27 from the front in the region of the saw teeth, is rigidly arranged on the gearing housing 14 between the gearing housing 14 and the base plate 16.

A motor, not shown in further detail, transfers its rotary movement to a motor shaft 18, which ends in a shaft pinion 19 and projects into the inner housing 15. A gear 20 meshes with the pinion 19, is mounted axially parallel to the motor shaft 18 and rotatably drives an eccentric rod acting as a crank 21, which engages in a sliding block-like slide element 22, which is fixedly connected to a lifting mechanism 24, more particularly by welding.

The lifting mechanism 24 is mounted in its upper region in an upper lifting mechanism guide 25 and in its lower region in a lower lifting mechanism guide 26 so as to be guided in a sliding and linear manner.

The lifting mechanism guides 25, 26 are spaced relatively far apart, so that the lifting mechanism 24 only projects minimally beyond the lower lifting mechanism guide 26 and is thereby particularly reliably protected against bending.

A pendulum lever 28 arranged below on the gearing housing 14 is driven by the gear 20 in a manner not explained in further detail so as to oscillate, its pendulum roller 29 being supported against the rear of the saw blade 27 and imparting a forward and back oscillating stroke parallel to the feed direction in the saw blade 27 together with the lifting mechanism 24.

At its lower end, the lifting mechanism 24 supports a clamping sleeve 32, which is torsionally elastically pretensioned by means of a torsion spring 33 in order to accommodate and clamp a saw blade 27. The latter is supported at the top with its clamping end against a centring bolt 31, which is elastically longitudinally displaceably mounted so as to be protected against spring means, not described in further detail.

Supported on its front side in the inner housing 15 is a support lever 300, by means of which a sealing element 700 is arranged in an intermediate space between the gearing housing 14 and the inner housing 15 so as to be displaceably guided.

Extending parallel to and behind the lifting mechanism 24 is an axle 100, around which a restoring spring 800 loops, which is used for restoring the support lever 300, together with the clamping lever 200 supporting said support lever (Fig. 6), back into its starting position.

The axle 100 is arranged together with the restoring spring 800 and the clamping lever 200 on a support strip 900, which can be screwed to the inner housing 15.

Figure 2 is an enlarged section of Figure 1 in the region of the clamping elements and illustrates that the clamping sleeve 32, the lever 300, the axle 100 and the restoring spring 800 are arranged inside the inner housing 15.

Figure 3 is a vertical cross section through the jig saw 10 according to Figure 1 with the section taken behind the support strip 900 with a view thereof. Consequently, it is clear that the support strip 900 is arranged behind the lifting mechanism 24 and offset parallel thereto and supports the pivot axle 100 for the levers 200, 300, which can be pivoted inwards into the plane of the drawing by means of the button 600 arranged projecting laterally from the gearing housing 14. As a result of this pivoting movement, the lever 200, 300 on the one hand pushes the lifting mechanism 24 with the clamping sleeve 32 in the plane of the drawing and simultaneously rotates or pivots the clamping sleeve 32 about the axis 240 of the lifting mechanism 24.

Consequently, when the saw blade 27 is ejected from the clamping sleeve 32, the saw blade rear is prevented from striking or twisting against the pendulum roller 29.

Figure 4 is a cross section through the front region of the gearing housing 14 parallel to the base plate 16. On the left in the viewing direction is the motor shaft 18 with the pinion 19 for driving the lifting mechanism 24 transversely to the motor shaft and the elements for releasing or clamping the saw blade 27.

The operating button 600 projects laterally upwards in the viewing direction beyond the gearing housing 14 and needs to be displaced to the right in order to rotate the clamping sleeve 32. The operating button 600 sits rigidly on the clamping lever 200, which extends at right angles to the left bending in the shape of an arc and - to the right in the viewing direction - is mounted so as to pivot about the axle 100.

The clamping lever 200 comprises a cam region 202, which in its neutral position is positioned at a contact-free distance from the clamping sleeve 32. When the operating button 600 is actuated, the clamping lever 200 is pivoted downwards to the right in the viewing direction about the axle 100, the cam region 202 forcing the lifting mechanism 24 with the clamping sleeve 32 to the right in

the viewing direction, i.e. forwards in the feed direction. During this process, the support lever 300, which is resiliently connected in a leaf spring-like manner to the clamping lever 200, follows the pivoting movement about the axle 100. The support lever 300 is supported with its front abutment 301 against the inner contour 501 of the inner housing 15 acting as a sliding block. During the pivoting movement of the clamping lever 200 to the right in the viewing direction, the abutment 301 reaches the driving nose 400 of the clamping sleeve 32, which it drives until the latter reaches its open position shown in Figure 4, in which it stops itself, releases or ejects the saw blade 27 and allows for the insertion of a new saw blade. Arranged top left in the viewing direction is the switch 131 for the current supply to the electromotor, not shown.

Figure 5 is a complete cross section through the jig saw 10 according to Figure 3, the upper region of the lifting mechanism 24 and the pendulum bearing of the upper lifting mechanism bearing 25 with downwardly pointing struts 23 integrally arranged thereon being recognisable, the slide element 22, which is rigidly connected to the lifting mechanism 24, being supported against the struts 23 on both sides. Consequently, the lifting mechanism 24 exhibits particularly good operating rigidity, particularly in the case of arcuate cuts, and reliably absorbs the high torsion forces which are transmitted during such cuts by the saw blade. Otherwise, the details correspond extensively to those of Figure 3.

Figure 6 shows the front region of the inner housing 15 of the jig saw 10 in a simplified schematic cross section taken parallel to the base plate 16. Recognisable approximately in the centre of the inner housing 15 is the circular cross section of the lifting mechanism 24, about which the outer contour of the clamping sleeve 32 extends concentrically. The clamping sleeve 32 is illustrated by continuous lines in its open position, in which its radially projecting driving nose 400 points at right angles to the left in the viewing direction, and is

illustrated by dot-dash lines in its clamping position, in which the driving nose 400 points through approximately 20° to the right in the viewing direction.

The elements used for actuating the clamping sleeve 32 are also illustrated schematically by dot-dash lines in their neutral position and by continuous lines in the release position, the operating button 600 pointing to the right in the viewing direction with the angled clamping lever 200 and the wedge-shaped cam region 202 in the first position, in which the support lever 300, which is hingedly or elastically connected to the angled clamping lever 200, is positioned with the abutment 301 in close proximity to the driving nose 400 of the tensioned clamping sleeve 32. A sealing element 700 is displaceably arranged between the levers 200, 300 and the inner housing 15 in the region of an aperture 502 in the gearing housing 14, 15, which sealing element seals the aperture 502 against dust penetration from the outside and against lubricant leakage from the inside and extends outwards through the region of the clamping lever 200 supporting the operating button 600.

[In] the release position of the levers 200, 300 illustrated in continuous lines, the latter are pivoted together with the wedge region 202 to the left about the axle 100 lying behind the lifting mechanism axis 240, the wedge region 202 being supported from behind against the lifting mechanism 24, so that the latter is displaced downwards in the viewing direction, i.e. actually in the feed direction. In this respect, the operating button 600 is disposed in the left-hand abutment position at the end of the aperture 502, in which the abutment 301 of the support lever 300 has pivoted the driving nose 400 of the clamping sleeve 32 to the left in the viewing direction into its end position, in which the saw blade can be removed or a new saw blade can be inserted.

The inner contour 501 of the inner housing 15 forms a guide curve, against which the support lever 300 with the abutment 301 can be supported in

sliding fashion, so that said support lever 300 can be positioned at all times in a defined support position relative to the driving nose 400.

The support lever 300 is rotatably mounted on the clamping lever 200 so as to be elastically prestressed by means of a pivot axle 201. The aperture 502 in the gearing housing 14, 15 is sealed by the sealing element 700, so that no dust can penetrate the gearing housing from outside and, conversely, no lubricant can escape from the inner housing 15 to the outside.

The clamping lever 200 is prestressed by means of a restoring spring 800, which attempts to return the clamping lever 200 to its neutral position. As soon as the operating end releases the operating button 600 again following the opening of the clamping sleeve 32, the operating button 600 returns to its neutral position.

Figure 7 shows an embodiment of the invention, in which the lever elements for rotating the clamping sleeve 32 are made of plastics material. In this respect, the sealing element 700 forms part of the clamping lever 200 constructed as an annular plastics material element. Moulded in said clamping lever 200 is the wedge-shaped cam contour 202 for pivoting the lifting mechanism 24 forwards when the clamping sleeve 32 is opened. On a pivot axle 201, the clamping lever 200 supports the two-arm support lever 300, which supports a cam 302 and 303 at either end. When the operating lever 600 is tensioned, the cam 302 is supported against the inner contour 501 of the inner housing 15 or the housing wall thereof, which extends congruent to the recess in the lever 200, in accordance with Figure 6, whilst the cam 303 is supported against the inner contour 501 of the inner housing as the clamping lever 200 slides back with the support lever 300, so that the cam 302 remains at a contact-free distance from clamping sleeve 32. Consequently, it is possible to dispense with a restoring or torsion spring, which forces the support lever 300 against the inner contour 501 relative to the clamping lever 200 and which in the other embodiments ensures that there is no contact

between the clamping sleeve 32 and the support lever 300 during the operating stroke of the lifting mechanism 24.

The clamping sleeve 32 is illustrated in its (still) closed position in two movement phases, i.e. twice in continuous lines, and in its open position in two movement phases, i.e. twice in broken lines. The path of movement of the driving nose 400 is also shown twice in broken lines, during opening and during return to the closed position of the clamping sleeve 32.

Figure 8 shows the embodiment according to Figure 7 in the open position of the clamping sleeve 32, in which the driving nose 400 is pivoted to the right through 90°. Similarly, the operating button 600 with the levers 200, 300 is pivoted to the right, in order to pivot back to the left into the starting position when the button 600 is released. In this respect, the lifting mechanism 24 also swings back into its starting position, in which a new saw blade which is to be clamped is supported with its back against the pendulum roller 29 according to Figure 1.

Figure 9 is a perspective view of the lever elements according to Figures 7, 8 for rotating the clamping sleeve 32. In this drawing, the typical design of the levers 200, 300 as plastics material cast parts can be seen, the drawing also showing the sealing element 700' which is supported in the region of the operating button 600 between the clamping lever 200 and the inner housing.

Also clearly visible is the torsion spring 800, which attempts to force the clamping lever 200 about the axle 100 into its neutral position.

Figure 10 is a schematic view of a further embodiment of the operating elements for adjusting the clamping sleeve 32 with the driving nose 400. In this case, only a virtual axis of rotation 100' is provided. This is because the clamping lever 200' principally corresponding to the clamping lever 200 known from Figures 7 to 9 is solely guided along the inner contour 501 of the gearing housing 15 and is not rotatable about a fixed axle. As a result of the fact that only a virtual

axis of rotation 100' is provided, the displacement path of the clamping lever 200' or operating button 600' is smaller, as is the aperture 502'.

Figure 11 is a perspective view of the embodiment according to Figure 10 and shows that the operating button 600' sits centrally on sliding block-like sealing lips 601, which extend on both sides in the direction of pivot. The sealing lips 601 are intended to prevent the penetration of dust into the inner housing 15 or the leakage of lubricant. The sealing lips 601 of the operating button 600' are embedded and displaceably guided between the wall of the gearing housing 14 made of plastics material and the inner housing 15.

In order to move the clamping sleeve 32 into its release position, illustrated in continuous lines, the operating button 600' is pivoted through approximately 45° about the virtual axis 100': The clamping lever 200' is lockable with the operating button 600' and the sealing lips 601 and is connected via an axle 201' to the support lever 300'. A restoring spring 800' is secured at one end to an eyelet 208 of the clamping lever 200' and is held at its other end by means of a spring support 801 fitted in the inner housing 15. The rotatable support lever 300' is guided along the inner contour 501 of the gearing housing 15 in such a manner that it acts with its end-face abutment 301' upon the abutment nose 400 of the clamping sleeve 32 and pivots said nose through 110° to the left in the viewing direction.

A separate ring-like lifting mechanism advance 203, which is arranged in the lower region of the clamping lever 200', also rotates through 110°, driven by a small cam 305 of the rotatable support lever 300', which engages in a positive-locking manner in a recess 206 in the lifting mechanism advance 203.

In the "open" position, the lifting mechanism advance 203 acts with its eccentric inner contour 207 upon the lifting mechanism 24 in such a manner that the latter is pivoted in the feed direction. The saw blade 27 is thereby also pivoted out of the pendulum roller 29 according to Figure 1, so that it does not impact or

twist against said roller during ejection. In addition, the lifting mechanism advance 203 prevents the support lever 300' from accidentally contacting the lifting mechanism 24 or the clamping lever 32 during its operating stroke, in that it holds the support lever 300', which is guided in the recess 206 in the lifting mechanism advance 203, at a radial contact-free distance from lifting mechanism 24 at all times when the support lever 300' is in its neutral position. A region 500 of the gearing housing 15 or a separate swivel bearing block 500 accommodates the lifting mechanism advance 203 and guides and mounts said advance so that the latter can rotate easily and precisely.

Figure 12 is an exploded view of the operating elements according to Figure 11 - and accordingly with like reference numerals - and Figure 13 is a view of the front part of the inner housing 15 from behind, also known as the gearing cover, with the fitted operating elements bearing the reference numerals according to Figures 11 and 12.

In Figures 14 to 17, the front part of the gearing housing 14, 15 is shown in cross section parallel to the base plate 16 (Figure 1) - with a further embodiment of the actuating elements for clamping or releasing the saw blade 27 of the jig saw 10 according to Figure 1. This embodiment also realises the basic kinematic principles according to Figure 6, the operating elements being extensively constructed as sheet metal stamped bending parts. In this case, the aperture 502 in the gearing housing 14, 15 is constructed as an extremely narrow slot, which is particularly easy to seal. Furthermore, the metal parts are more wear-resistant as plastics material parts.

A sealing element 700" is fitted onto the clamping lever 200" and is guided so as to slide in an intermediate space 150 between the inner housing 15 and the outer plastics material housing 14. By way of the clamping lever 200" supporting the operating button 600", the support lever 300" made of sheet spring steel can be pivotably prestressed at its axle 201" by means of a torsion spring

610, so that it attempts to support itself by way of its abutment 301" against the inner contour 501 of the inner housing 15. The wedge-like cam 202" for advancing the lifting mechanism 24 is integrally moulded onto the angled clamping lever 200". The clamping lever 200" is mounted so as to pivot about the axle 100" and is secured so that it can be returned by means of a restoring spring 80" into its neutral position illustrated in Figure 14. The axle 100" with the clamping lever 200" is secured to a support strip 900" extending parallel to the feed direction and to the base plate 16 and can therefore be particularly easily fitted as a unit into the inner housing 15 or the housing cover, for example by means of screws, not shown. The clamping sleeve 32 is located in its clamping position. The support lever 300" is mounted on a pivot axle 201" so as to pivot relative to the clamping lever 200" and is prestressed by a torsion spring 310".

Figure 15 shows the embodiment according to Figure 14 with the operating button 600" completely pivoted to the right and the clamping sleeve 32 pivoted in the same direction by the levers 200", 300" into the open position. During this process, as in the embodiments described earlier, the support lever 300" is guided along the inner contour 501" of the inner housing 15 or the gearing cover. The sealing element 700" follows the movement of the clamping lever 200" with the operating button 600" in the intermediate space 150 between the gearing housing 14 and the inner housing 15. Consequently, the gearing housing 15 is sealed against dust penetration and lubricant loss.

Figure 16 is a perspective view according to Figures 14, 15, showing the construction of the clamping lever 200" as a sheet metal punched bending part, in particular the construction of the wedge-shaped cam region 202" as a twice downwardly angled end section of the support lever 300", the axle 100" engaging through both the cam region 202" as well as the clamping lever 200" per se. Also clearly recognisable is the torsion spring 310", which holds the support lever 300" with its abutment 301" prestressed against the inner contour 501". Particularly

clear is the arrangement of the support strip 900" as an angled sheet metal part with screw holes 901" for easy securing as a unit to the inner housing 15 or housing cover.

Figure 17 shows Figure 16 rotated through approximately 90 degrees in the plane of the drawing with like reference numerals, the construction of the abutment 301" of the support lever 300" and of the spring 800" being clearly recognisable.

Figures 18 to 21 show the front part of the gearing housing 14, 15 in cross section parallel to the base plate 16 (Figure 1) with a further embodiment of the actuating elements for clamping or releasing the saw blade 27 of the jig saw 10 according to Figure 1. This embodiment essentially differs from that according to Figures 14 to 17 only in that the support lever 300"" is not connected to the clamping lever 200"" via a hinge, but is rigidly connected to the clamping lever 200"" as a flexible leaf spring in such a manner that it is supported at all times in prestressed fashion against the inner contour 501 of the inner housing 15, also known as the gearing housing cover. Consequently, there is no need for an axle 202"' or a torsion spring 310"' according to Figures 14 to 17. Rather, a further simplification of the operating parts is possible.

A further difference between Figures 14 to 17 and Figures 18 to 21 consists in that an end abutment 902 is arranged on the support strip 900"", which end abutment limits the pivoting path of the driving nose 400 of the clamping sleeve 32 and thereby increases operating comfort during a saw blade change or prevents excess compression or overloading of the torsion spring, not described in further detail, which prestresses the clamping sleeve 32. Figures 18 to 21 illustrate the same parts as shown in Figures 14 to 17 with corresponding reference numerals with an additional fourth inverted comma.

Figure 18 shows the operating button 600"" with the clamping lever 200"" in its neutral position and the clamping sleeve 32 in its clamping position.

Figure 19 shows the embodiment according to Figure 18 with the operating button 600"" pivoted fully to the right with the levers 200"" and 300"" as well as the clamping sleeve 32. In this respect, the sealing element 700"" is also displaced to the right in the intermediate space 150. Clearly visible is how the abutment 301"" of the lever 300"" rests against the inner contour 501 of the inner housing 15 and is guided in sliding fashion along said contour, and the driving nose 400 is positioned in close proximity to the end abutment 920.

Figure 20 is a perspective view with levers 200"", 300"" with the button 600"" pivoted into their neutral position relative to the support strip 900"", in which the abutment 301"" of the lever 300"" made of thin spring steel sheet adopts a maximum distance from the end abutment 920.

Figure 21 is a view according to Figure 20 rotated through approximately 120° to the left, a support 305, which supports the support lever 300"" made of thin spring steel and is preferably welded to the clamping lever 200"", being particularly visible.

Claims

1. Manually guided jig saw machine (10) with a motor- and gearing housing (12, 14, 15) and a lifting mechanism (24), which is vertically displaceably guided in said housing, is drivable by the motor and at its lower end supports a clamping device with a clamping sleeve (32) for releasably accommodating a saw blade (27), it being possible to actuate the clamping sleeve (32) manually from the outside by means of a switching element (600, 300, 200) without the need for an auxiliary tool, characterised in that the clamping sleeve (32) and the switching elements (200, 300, 600) are at least partially arranged so as to be adjustable, more particularly rotatable, inside the gearing housing (14, 15).

2. Jig saw machine according to claim 1, characterised in that a switching element constructed as a clamping lever (200) is arranged in such a manner that it extends outwards through the gearing housing (14, 15).

3. Jig saw machine according to claim 1, characterised in that the switching elements (200, 300) are arranged so as to pivot about an axle (100) arranged inside the gearing housing (14, 15), and a through aperture (502) for a region of the clamping lever (200) supporting the operating button (600) is arranged, which is provided with sealing means, more particularly pivotable strip-like sealing means (700).

4. Jig saw machine according to claim 3, characterised in that at least one of the switching elements (200, 300) is constructed as a ring, preferably a half ring, which is pivotable about the axle (100).

5. Jig saw machine according to claim 4, characterised in that the switching elements (200, 300) are constructed as sheet metal punched bending parts and are coupled to one another in a resilient and/or hinged manner, more particularly in a spring prestressed manner.

6. Jig saw machine according to claim 5, characterised in that the clamping lever (200) supports an operating button (600) at its free end and in the region of its part mounted so as to pivot about the axle (100) supports a wedge region (202) for displacing the lifting mechanism (24) in a forward-swinging manner.

7. Jig saw machine according to claim 6, characterised in that the levers (200, 300) are rotatably mounted together on a support strip (900) and can be prestressed by means of a spring (800), the levers being supported and guided against a curve-like inner contour (502) of the inner housing (14) of the gearing housing so as to slide along said inner contour (502), and the support strip (900) can be releasably connected to the inner housing (15) as a unit together with the levers (200, 300).

8. Jig saw machine according to claim 7, characterised in that the support strip (900"") is constructed as a sheet metal punched part and supports an angled abutment (920) for limiting the pivoting path of the clamping sleeve (32), more particularly for the abutment of the driving nose (400).

9. Jig saw machine according to one of the preceding claims, characterised in that the levers (200, 300) are made of plastics material.

10. Jig saw machine according to one of claims 1 to 4, characterised in that a clamping lever (200"') constructed as a slide-like element and mounted on the

inner contour (502) of the inner housing (15) is pivotable about a purely virtual point of rotation (100'"), which supports the support lever (300'") in articulated fashion, which acts upon the clamping sleeve (32) and is coupled to a lifting mechanism advance (203), which is constructed as an annular part and with an eccentric ring inner side (207) forces the lifting mechanism (24) forwards when the clamping sleeve (32) is tensioned.

11. Jig saw machine according to claim 1, characterised in that the clamping lever (200""), which can be actuated from the outside, is constructed as a rigid sheet metal part and supports a resiliently mounted support lever (300""), more particularly prestressed via a pivot axle (201) and a torsion spring (310), for adjusting the clamping sleeve (32).

12. Jig saw machine according to claim 1, characterised in that the support lever (300"") is constructed as a resilient tongue, which is connected to the rigid clamping lever (200"") without articulation and in deformable fashion, more particularly by welding, and whose abutment (301"") is formed by an angled end region of the support lever (300"").

13. A manually guided jigsaw machine substantially as herein described with reference to the accompanying drawings.

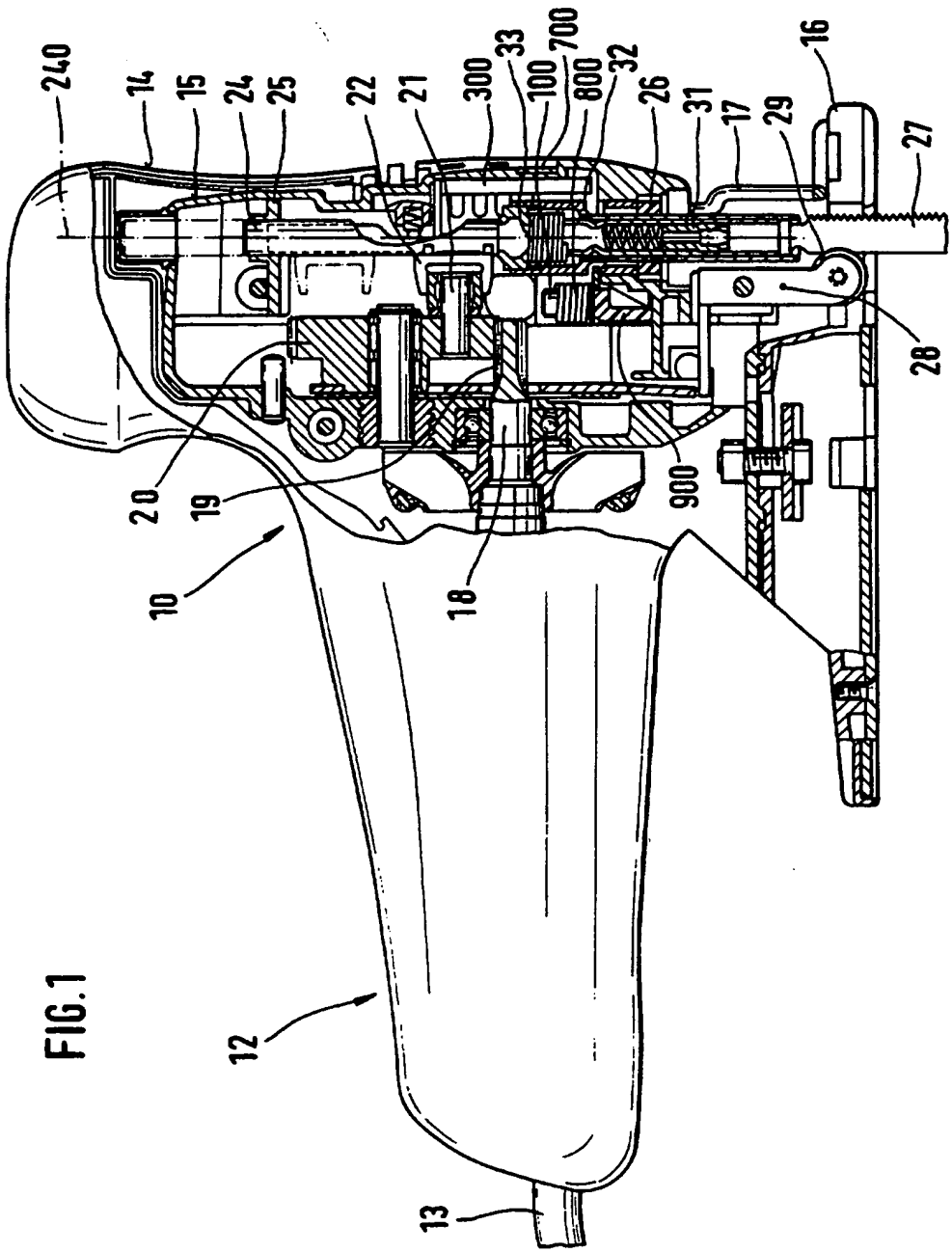

240
14
15
24
25
22
21
300
33
100
700
800
32
26
31
17
29
16
27
28
20
19
900
10
18
12
13

FIG.1

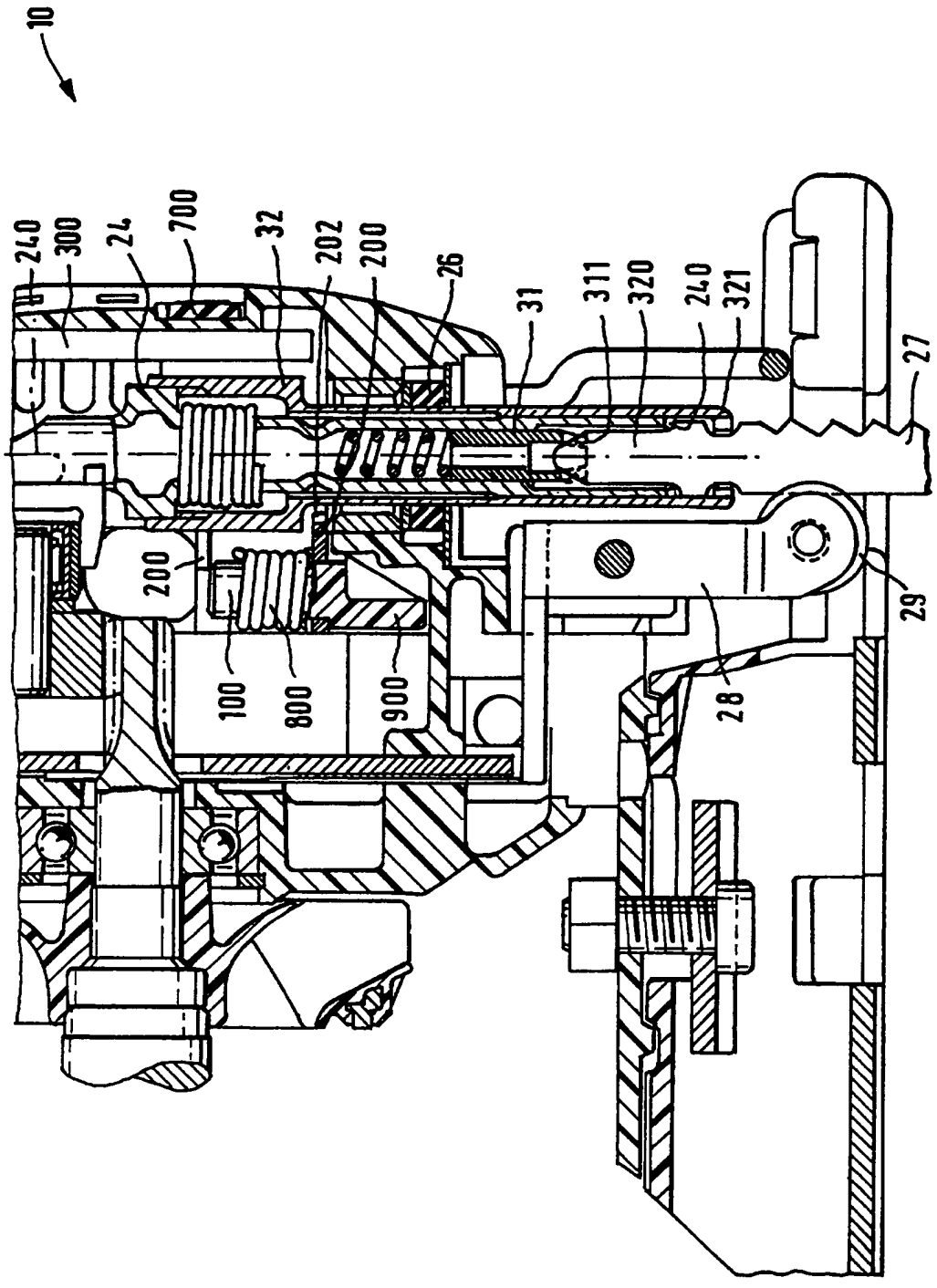

10
240
300
24
700
32
202
200
26
31
311
320
240
321
27
200
100
800
900
28
29

FIG. 2

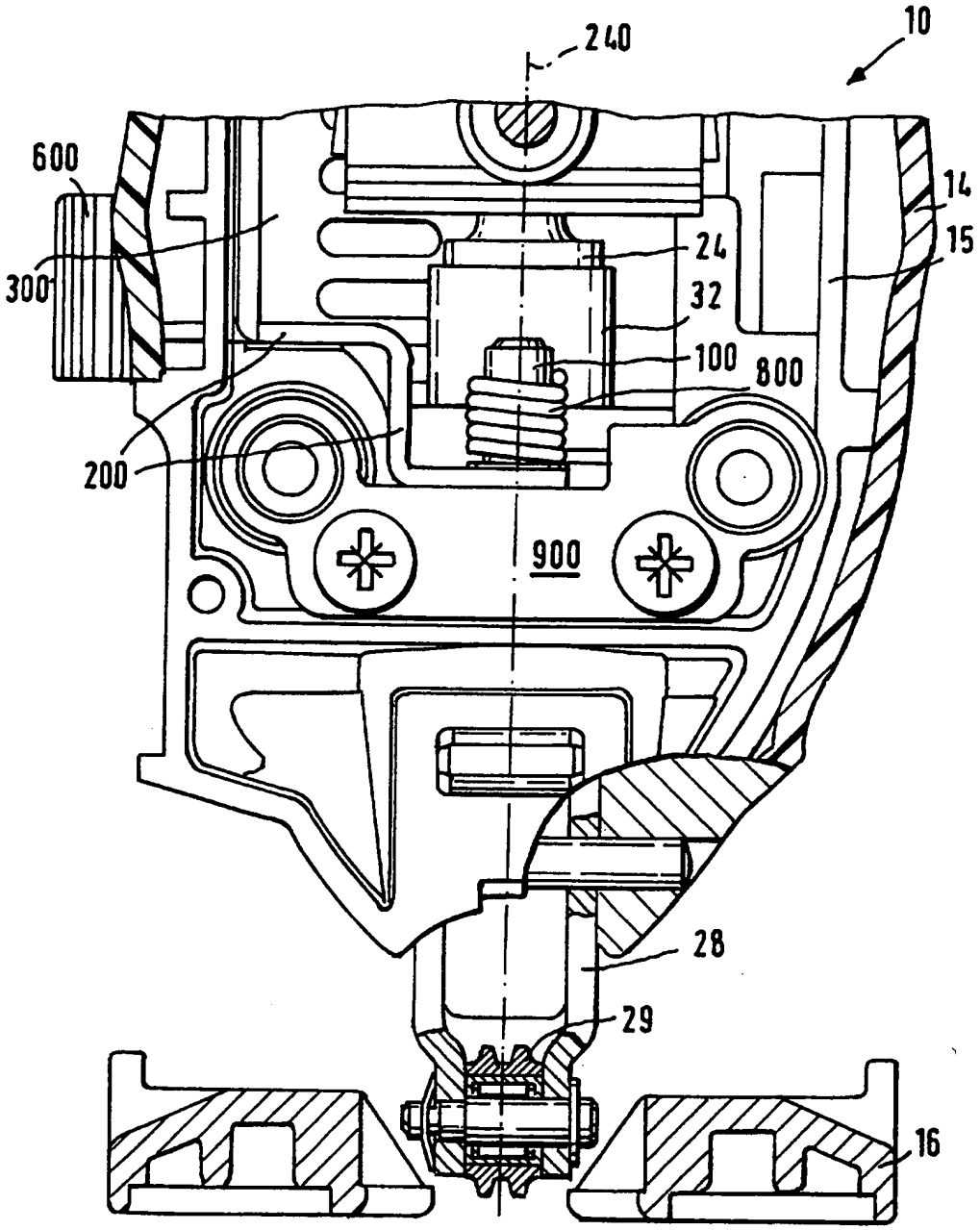


FIG.3

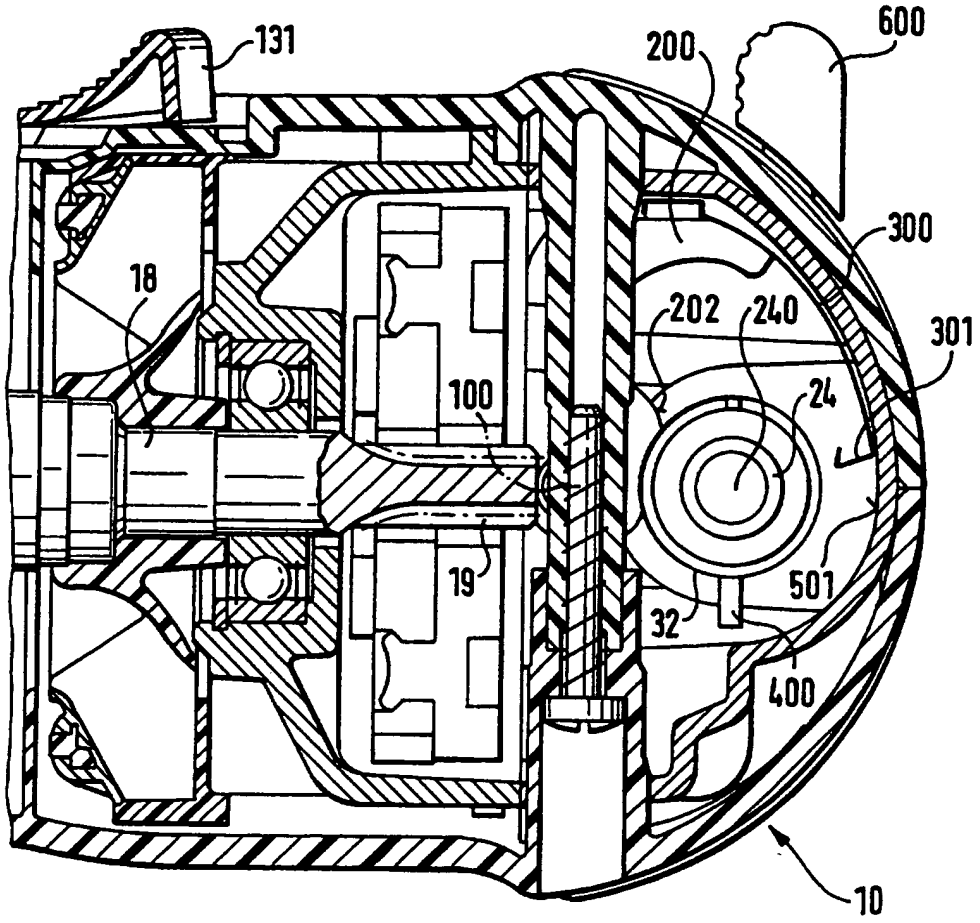


FIG. 4

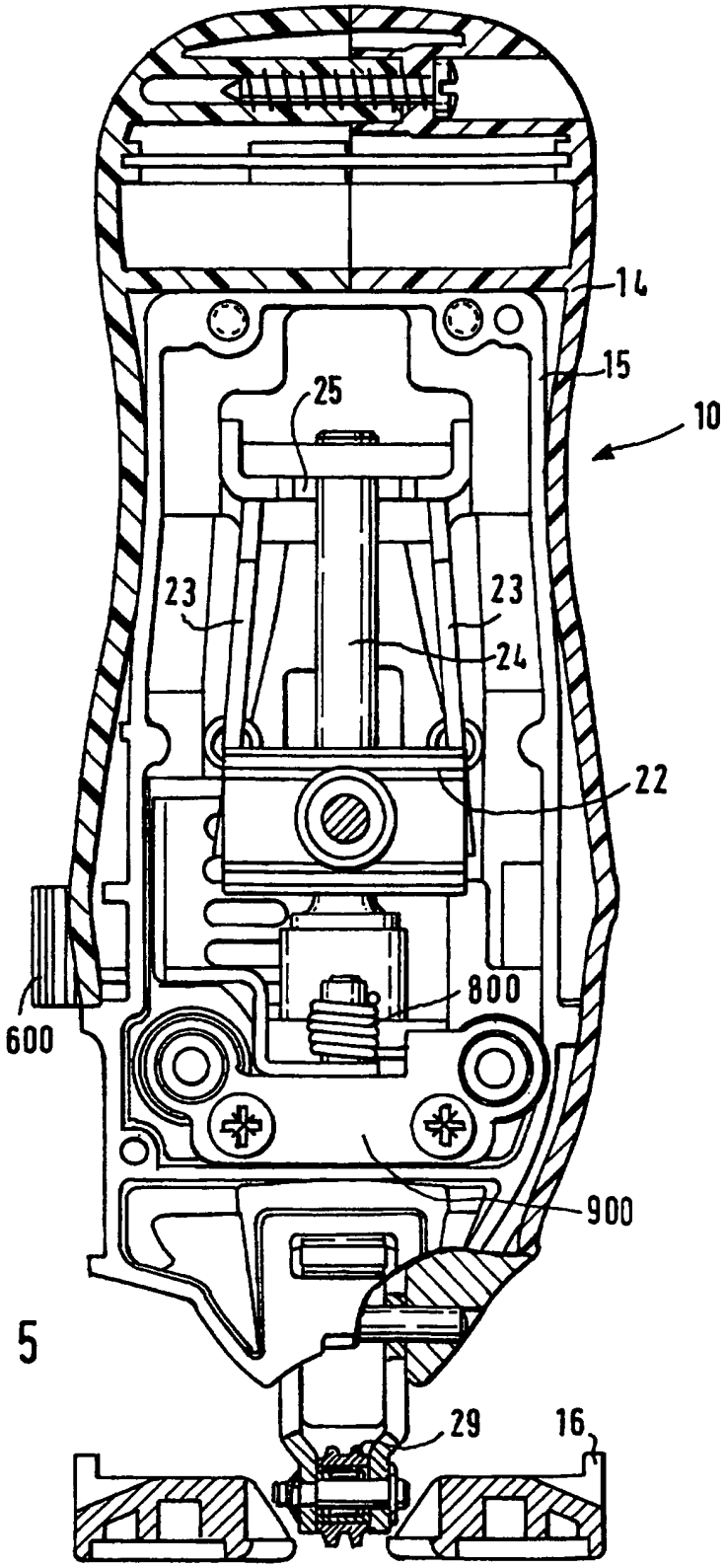


FIG. 5

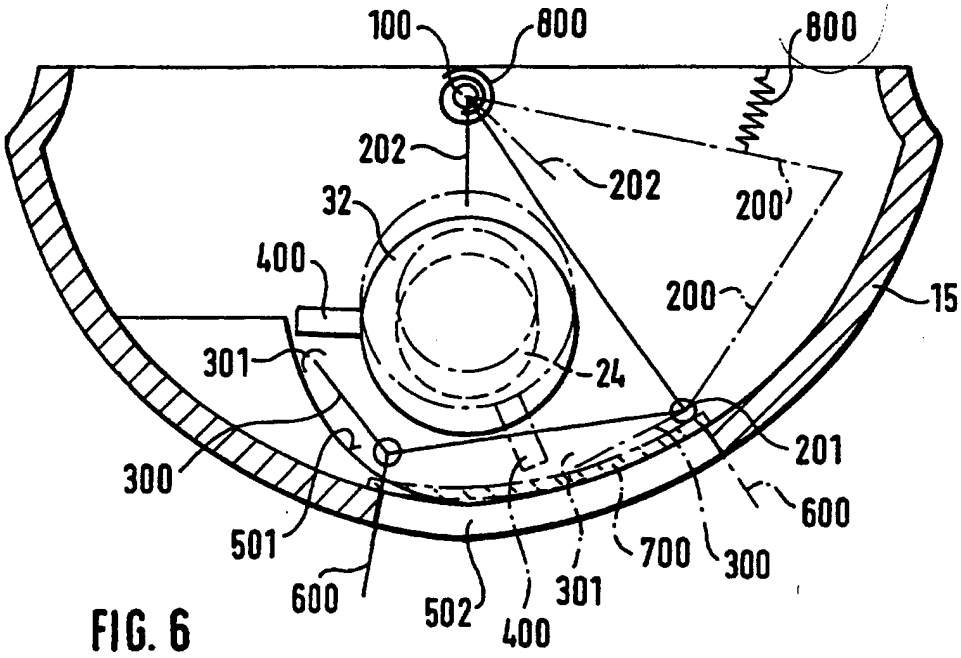

100
800
800
202
202
200
32
400
200
15
301
24
201
300
600
501
700
300
600
502
301
400

FIG. 6

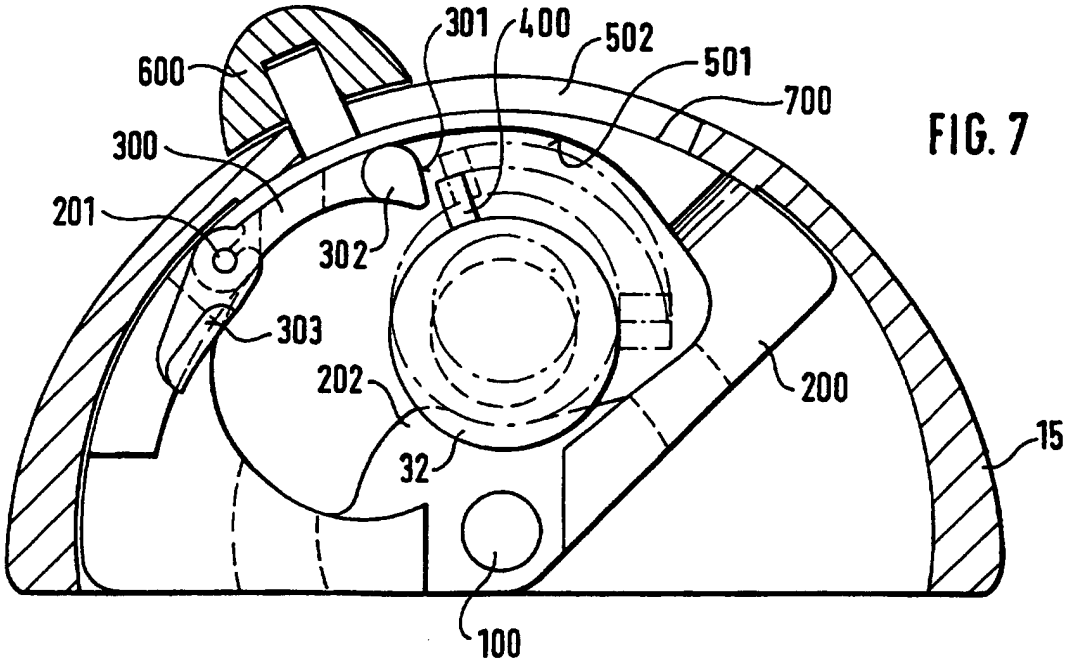

301
400
502
501
600
700
300
201
302
303
202
200
32
15
100

FIG. 7

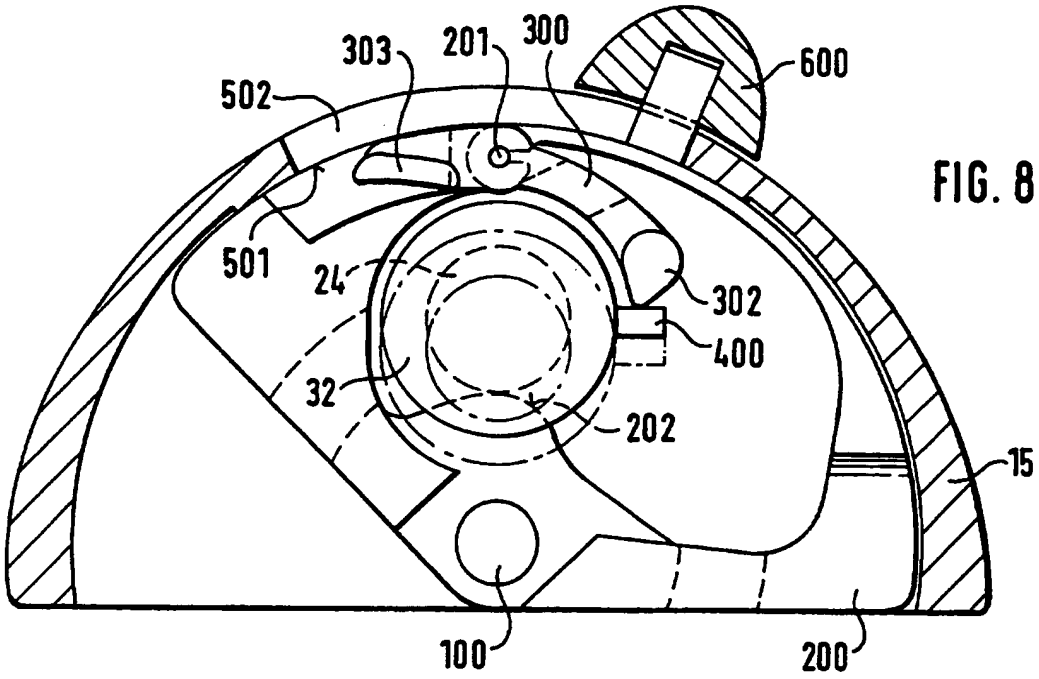

303
201
300
600
502
501
24
302
400
32
202
15
100
200

FIG. 8

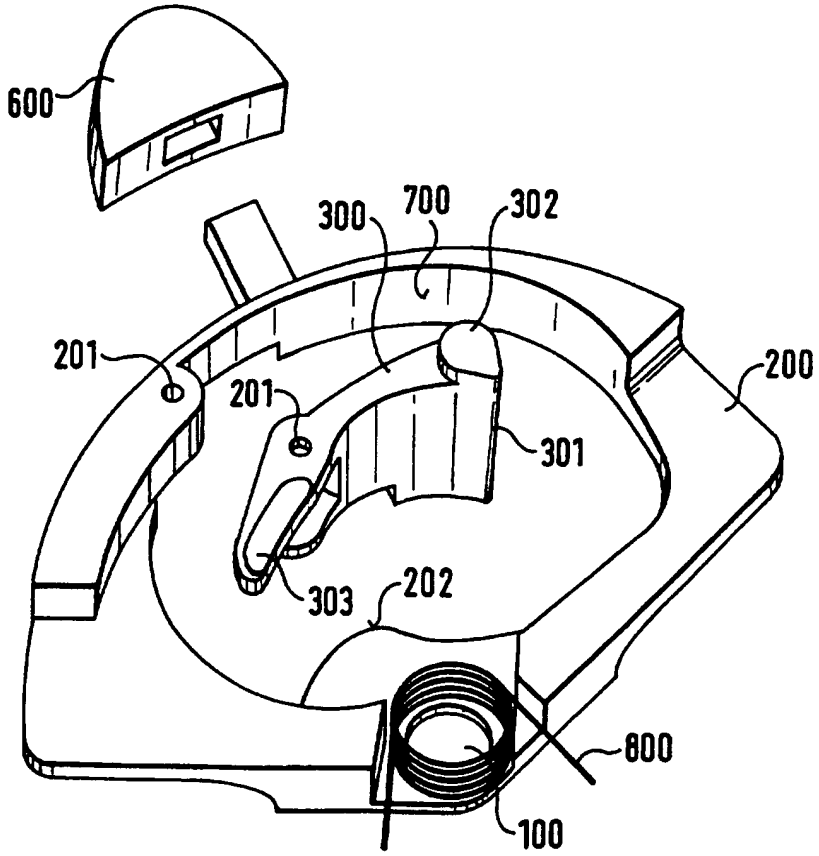

600
300
700
302
201
201
200
301
303
202
800
100

FIG. 9

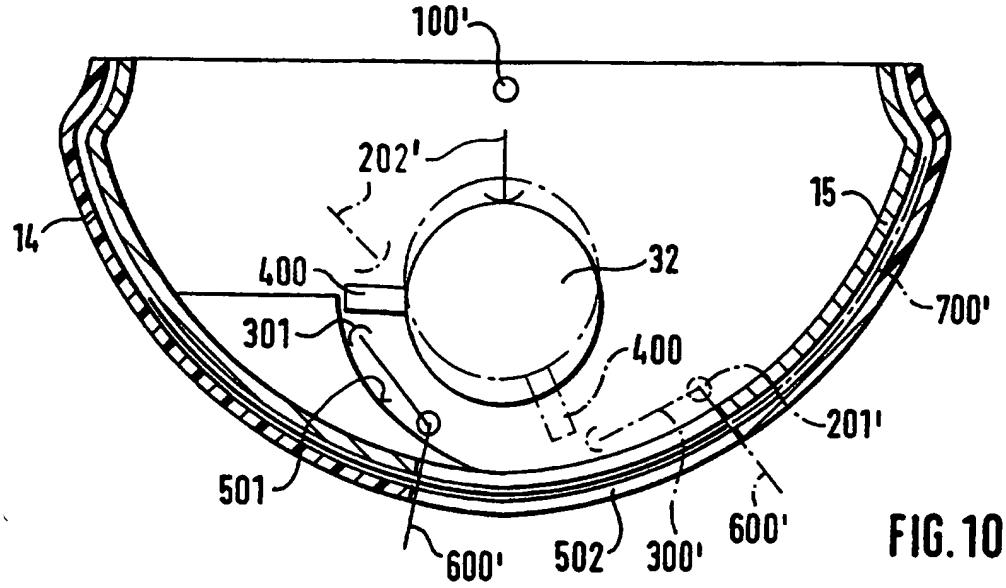

100'
202'
15
14
32
400
700'
301
400
201'
501
600'
502
300'
600'

FIG. 10

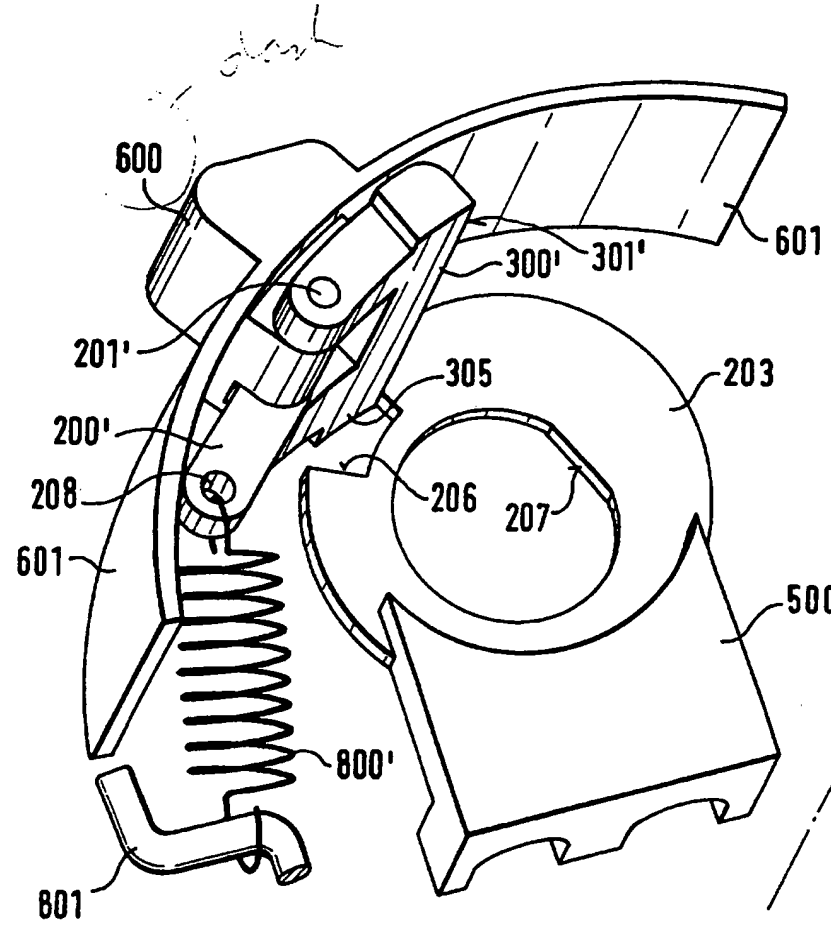

600
601
300'
301'
201'
305
203
200'
208
206
207
601
500
800'
100'
801

FIG. 11

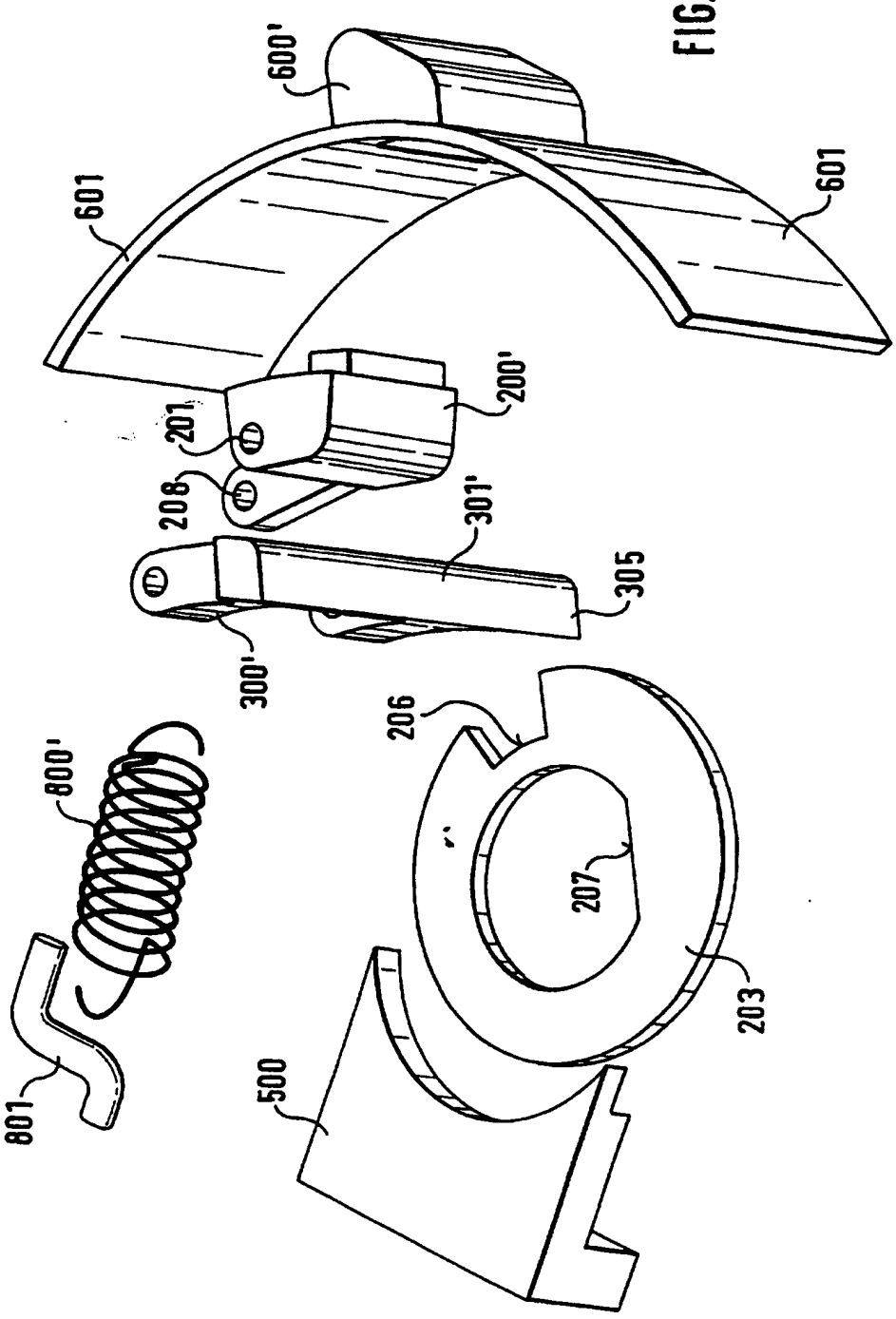


FIG. 12

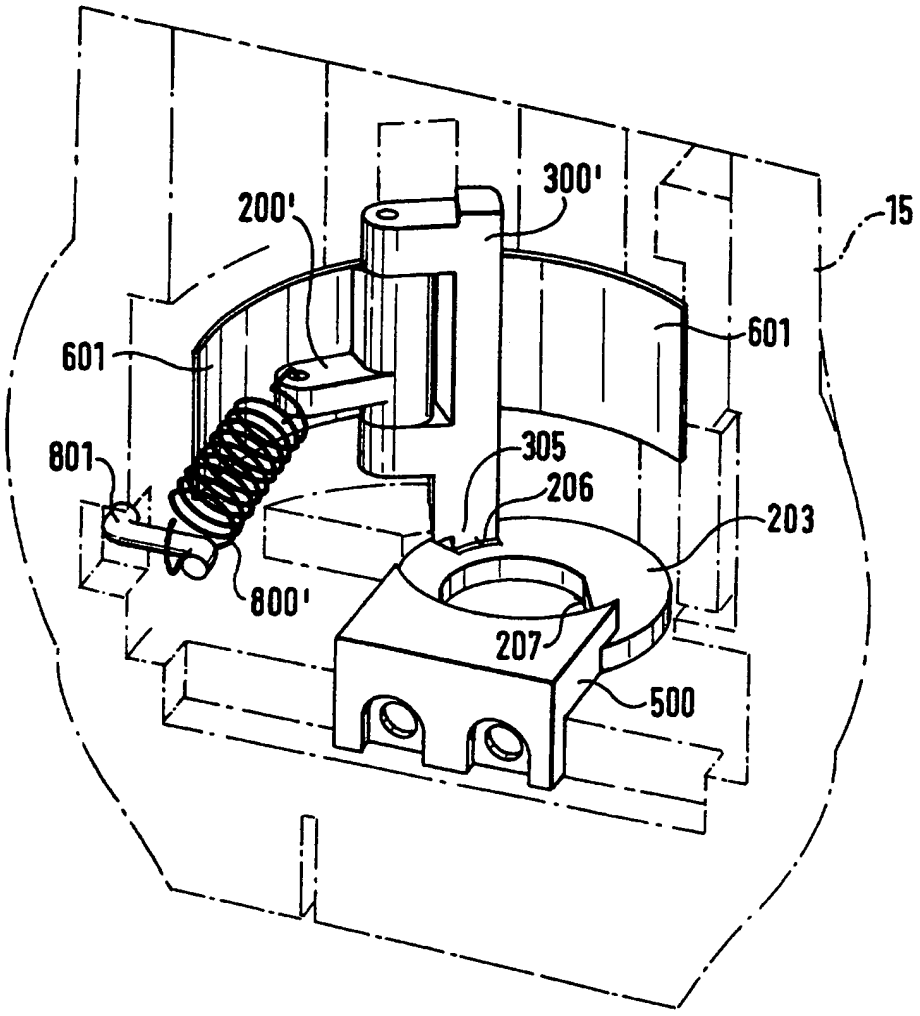


FIG. 13

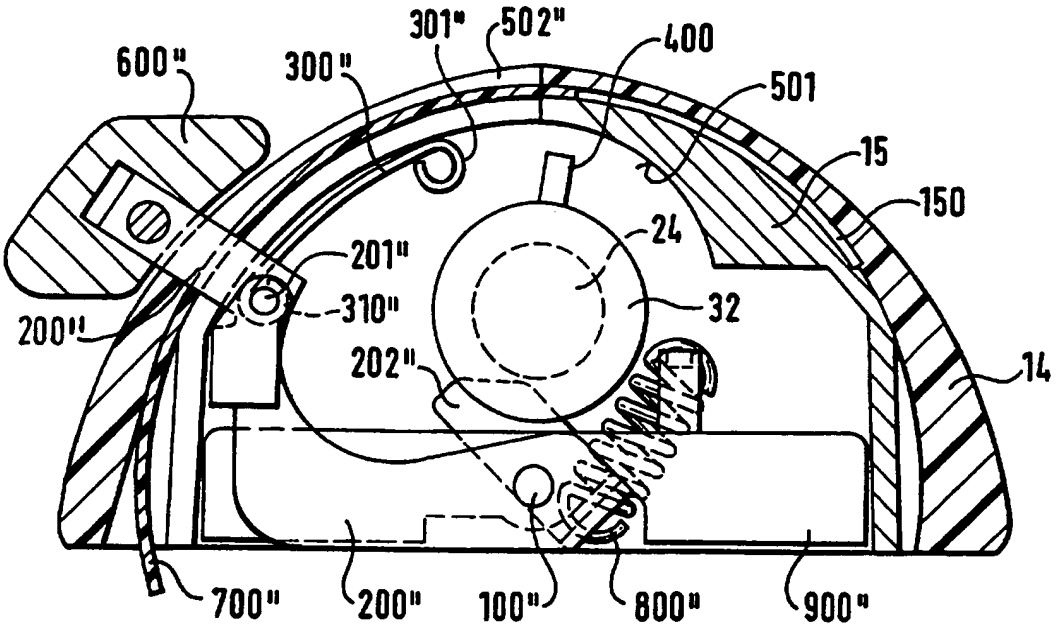

600"
300"
301"
502"
400
501
15
150
24
201"
310"
32
200"
202"
14
700"
200"
100"
800"
900"

FIG. 14

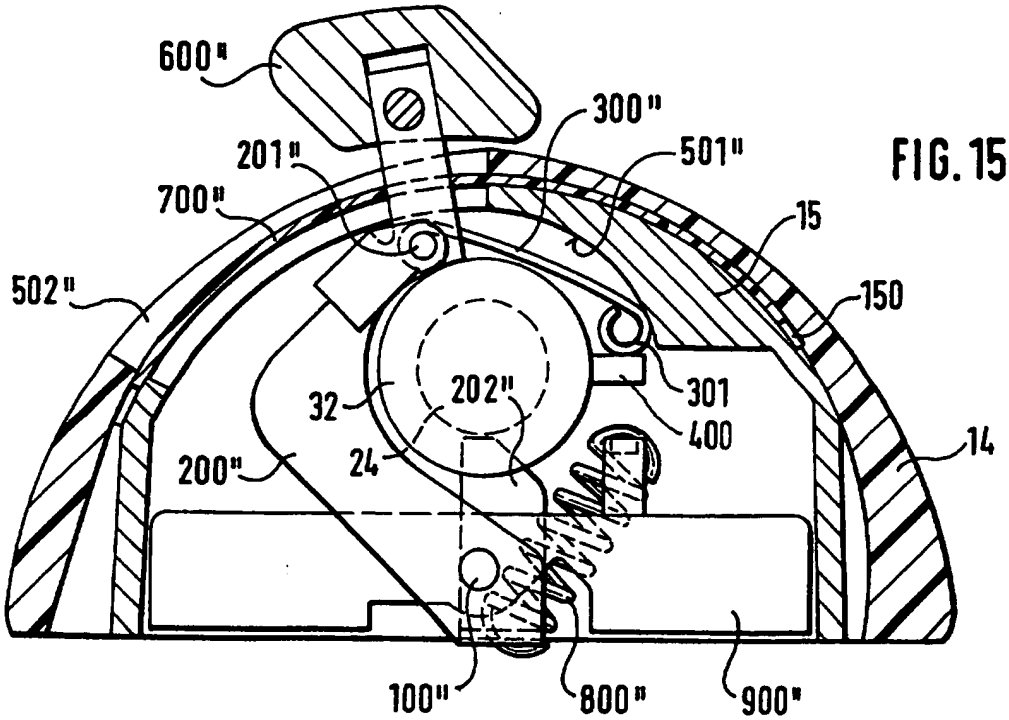
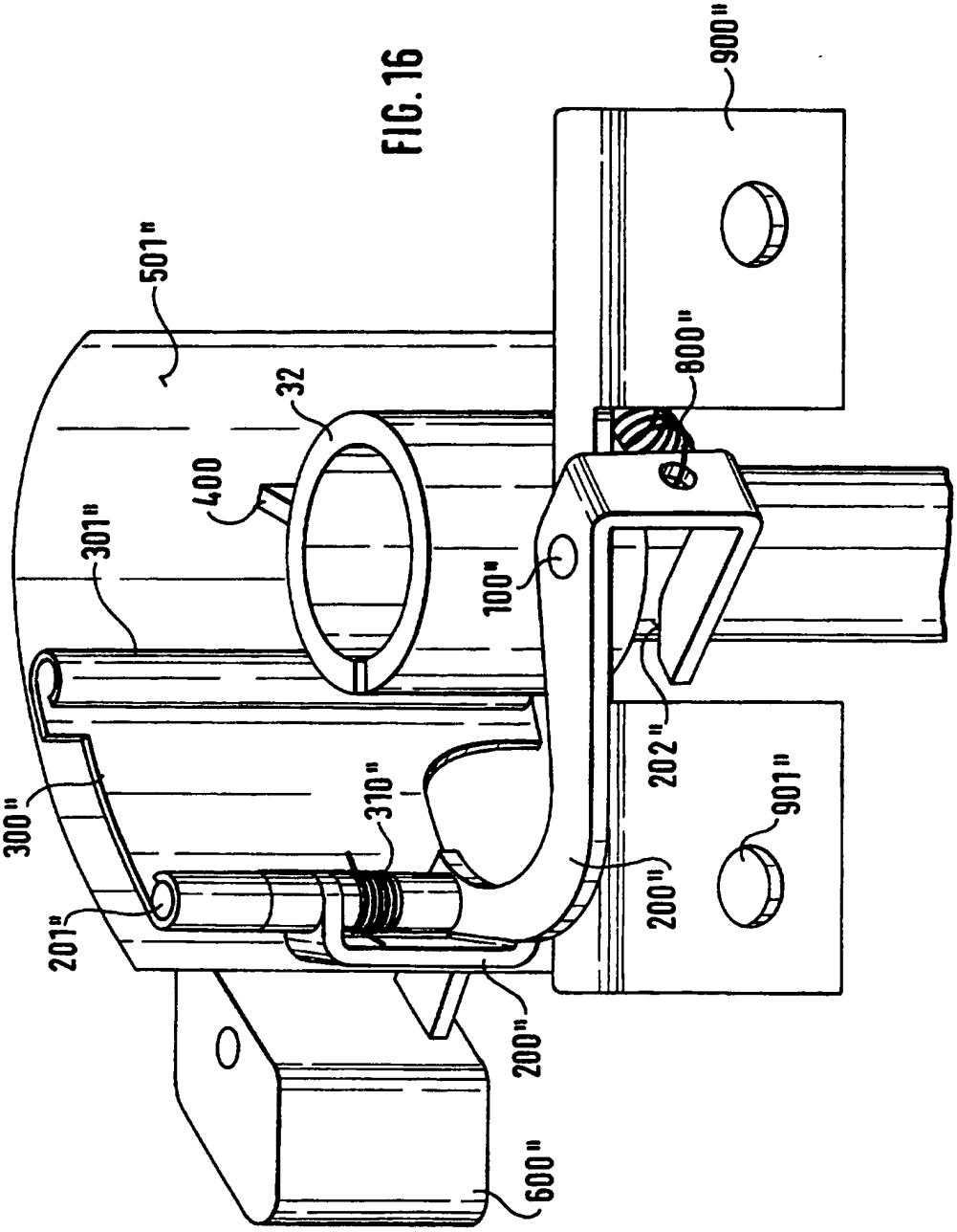

600"
300"
201"
501"
700"
15
502"
150
32
202"
301
400
14
200"
24
100"
800"
900"

FIG. 15

FIG. 16



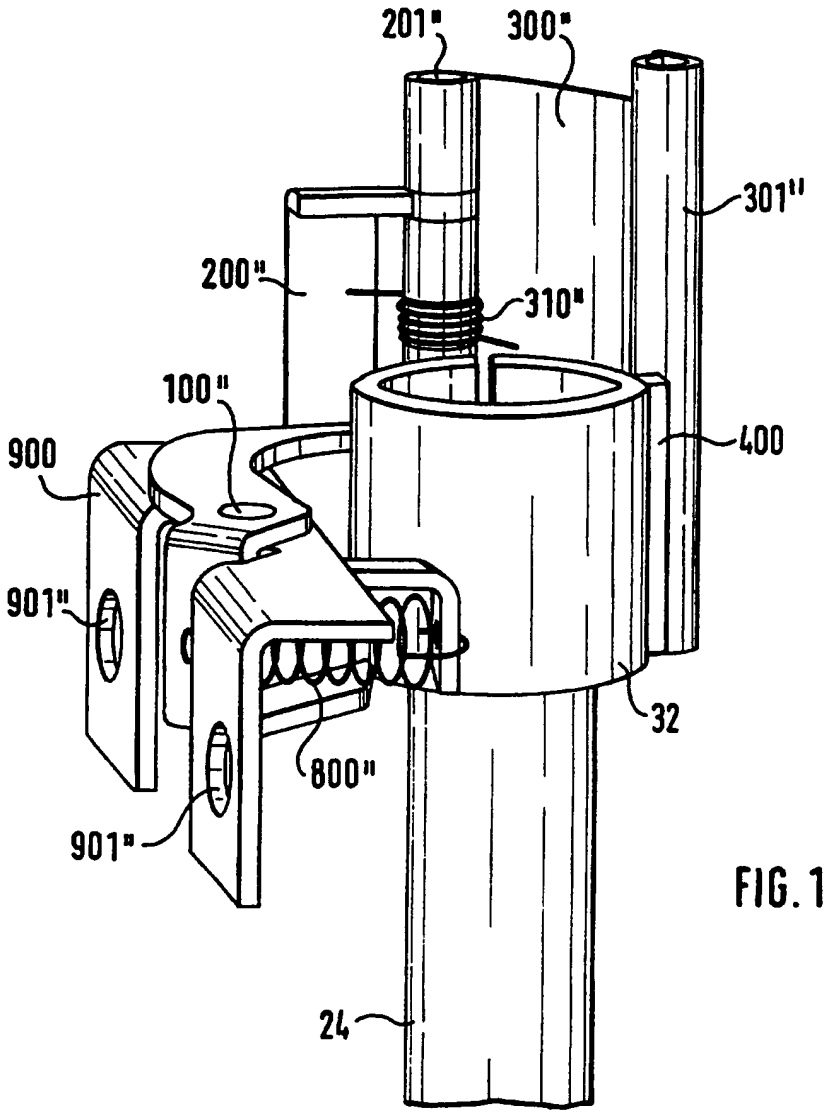


FIG. 17

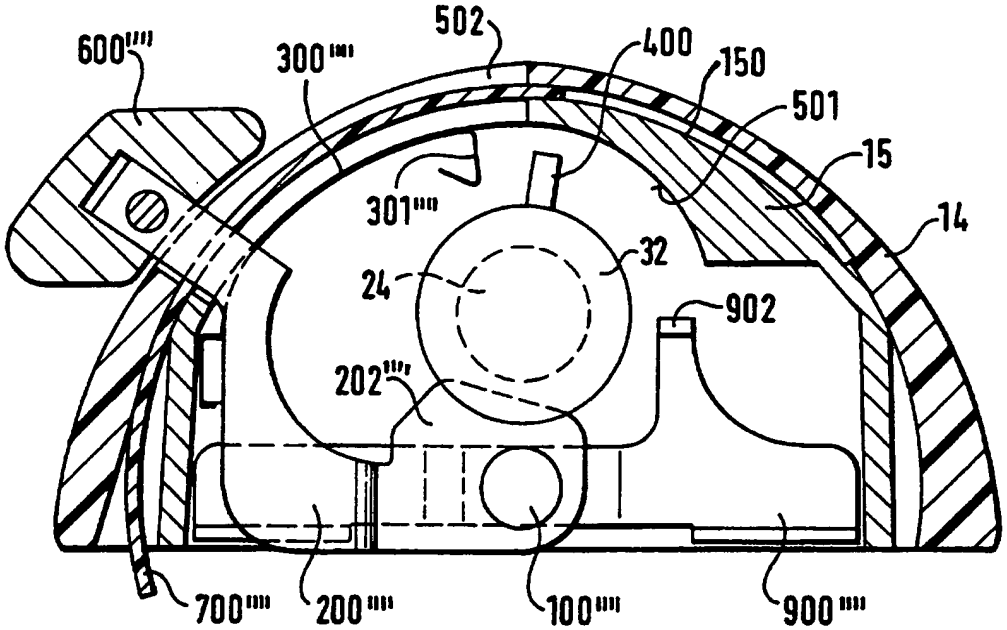

600''''
300''''
502
400
150
501
15
14
301''''
32
24
902
202''''
700''''
200''''
100''''
900''''

FIG. 18

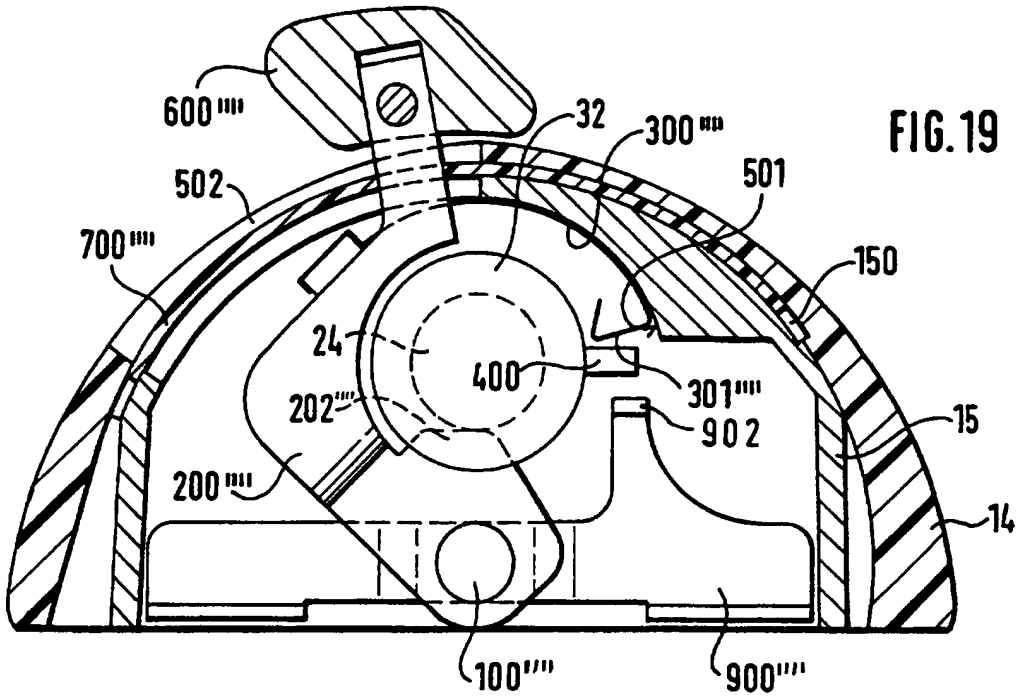

600''''
32
300''''
501
502
700''''
150
24
400
301''''
202''''
902
15
200''''
14
100''''
900''''

FIG. 19

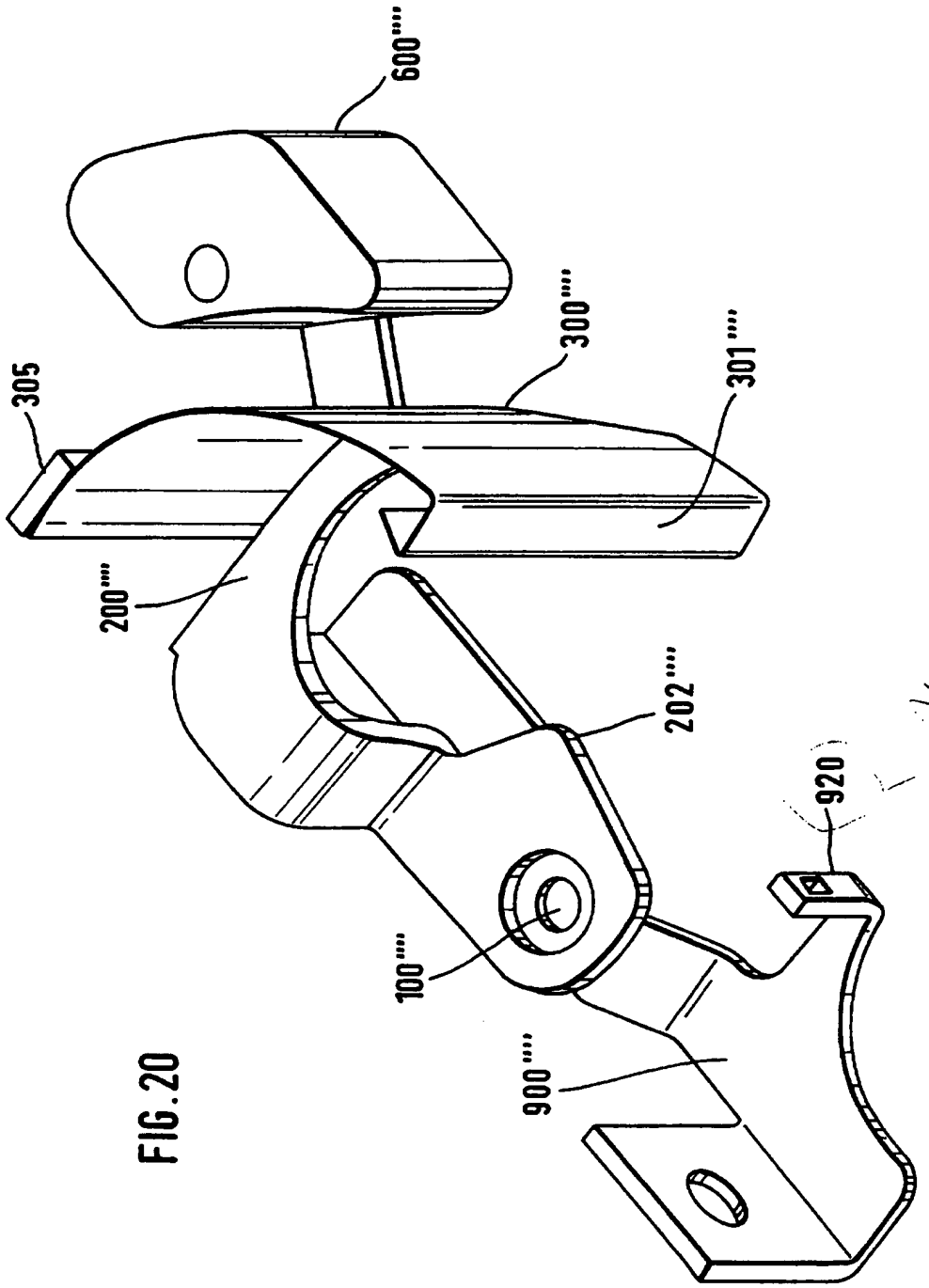


FIG.20

FIG.21